

2.0 FACILITY CHARACTERIZATION

This section presents background information about DCD that will be used in support of the Phase I ERA. Section 2.1 briefly describes the operations at DCD. Section 2.2 describes the environmental setting of the facility. Section 2.3 briefly summarizes the emissions information, including a description of the sources, the available emissions data, and the procedures used to estimate emission rates. Section 2.4 discusses the selection of COPCs. Section 2.5 summarizes the air dispersion modeling performed to estimate unitized air concentrations and wet and dry deposition rates. The HHRA protocol (Tetra Tech 2001b) provides detailed information about DCD, including its history and operations, RCRA-regulated activities, and air emissions.

2.1 OPERATIONS AT DCD

DCD is one of eight locations in the continental United State where chemical munitions are stored. The 19,400-acre facility is a government owned and operated installation under the administration of the U.S. Army Soldiers and Biological Chemical Command (SBCCOM), which is under the direction of U.S. Army Materiel Command (AMC). The mission of DCD includes: (1) storage, inspection, monitoring, and maintenance of chemical munitions; (2) demilitarization of stockpiled chemical munitions; and (3) testing of alternative chemical munition disposal methods. RCRA-regulated activities at DCD related to this mission include the treatment of munitions at TOCDF and CAMDS, and a variety of hazardous waste storage activities (including the Area 10 Storage facility where stockpile chemical munitions are stored).

TOCDF is a multi-furnace incineration facility used to demilitarize chemical agents and munitions stored at DCD. TOCDF operations involving the demilitarization of chemical agents and munitions began in 1996. Operation of TOCDF is expected to end in 2004. TOCDF recently completed treatment of all munitions stored at DCD containing the chemical agent GB. Remaining activities include the treatment of munitions containing the chemical agent VX and sulfur mustard.

CAMDS began operation in September 1979 as a research activity designed to develop methods and procedures—primarily employing various types of incineration—to destroy chemical munitions. From May 31, 1991 until 1996, CAMDS operated under a research, development, and demonstration (RD&D) permit issued by DSHW. On July 1, 1996, CAMDS submitted Part B of a RCRA permit application to

DSHW for the metal parts furnace (MPF), the liquid incinerator (LIC), and the deactivation furnace system (DFS).

In September 1999, DSHW issued a RCRA permit for the MPF and LIC. Since the RCRA Part B permit application was submitted, only the MPF has operated; the LIC and DFS are currently not operating. CAMDS anticipates that the MPF will be used in the future to destroy off-specification VX-hydrolysate, pretreated ton containers that previously contained lewisite, and empty ton containers. The MPF may also be used to treat debris from Assembled Chemical Weapons Assessment (ACWA) support work and ACWA research and development debris. Facility personnel have indicated that CAMDS will be used in the future to destroy stockpiles of VX munitions stored at DCD.

2.2 ENVIRONMENTAL SETTING

DCD is located in the moderately flat and arid Rush Valley, Tooele County, Utah (A.T. Kearney [ATK] 1996; Tetra Tech 2000). Rush Valley is surrounded by the Great Salt Lake to the north, the Oquirrh Mountains to the east, the West Tintic and Sheeprock Mountains to the south, and the Stansbury and Onaqui Mountains to the west. DCD is located approximately 50 miles southwest of Salt Lake City, 20 miles south of the city of Tooele, 20 miles south of the Tooele Army Depot (TEAD), 30 miles south of the Great Salt Lake, and 38 miles west of the city of Provo (see Figure 2-1). TOCDF is located adjacent to the Area 10 Storage facility in the west central portion of the DCD. CAMDS is located about 2 miles southwest of TOCDF. The majority of the land surrounding DCD is federally owned. Privately owned parcels of land adjacent to the facility are used for agricultural and farming purposes (MRI 1998; Tetra Tech 2000).

Ecosystems at the site that will be evaluated in the Phase I ERA include (1) the scrub-shrub valley floor, (2) montane areas east and west of DCD, and (3) several freshwater areas. The soil in the area consists of sand, silt, gravel, and clay and is poorly drained and alkaline in nature (MRI 1998). The scrub-shrub vegetation includes shrubs, mainly sagebrush and plains prickly pear, interspersed with grasses, which include bluebunch wheatgrass and plains bluegrass. This area provides habitat for small mammals and sage grouse. Based on changes in the composition of vegetative communities, 5,400 feet above mean sea level was selected as the elevation demarcating the shrub-scrub habitat from the montane habitat. Talus slopes typify the montane areas in the mountains east and west of DCD. These areas include rocky

FIGURE 2-1

outcrops, hills, and canyons that favor juniper and pinyon pine. Utah juniper, Douglas fir, and pockets of oaks and maples dominate the higher elevations.

Water bodies in the assessment area include: (1) Rush Lake, which is approximately 10 miles north of TOCDF; (2) the Fitzgerald Wildlife Management Area (Atherly Reservoir), which lies about 9 miles south-southwest of DCD; (3) the Bureau of Land Management impoundment (also known as the Clover Pond) which is a small, wetlands area immediately west of the DCD fenceline; and (4) Rainbow Reservoir, which lies on the northern edge of DCD.

Rush Valley is a closed basin, with no outlet for surface water (Tetra Tech 2000). Some of the precipitation that falls on the mountains encircling Rush Valley flows to lower elevations in streams. Most of these streams are intermittent and flow only in direct response to snowmelt and summer rainfall. Nearly all surface drainage is directed northward toward Rush Lake, at the northern boundary of the valley. The surface water system in Rush Valley is composed of several perennial and intermittent streams, as well as Rainbow Reservoir. The stream water recharges the ground water, is lost to evaporation, or flows to Clover Reservoir on BLM land west of the depot. Thus, several small streams that originate in the mountains disappear on the dry Rush Valley floor. No surface waters leave the valley (MRI 1998). The Rainbow Reservoir, a 3.5-acre water body, is the only man-made reservoir within the installation boundaries; the reservoir has a capacity of 20 million gallons of water. Water from Ophir Creek, a perennial stream whose headwaters originate in the Oquirrh Mountains to the east of DCD, is diverted to and stored in Rainbow Reservoir (Tetra Tech 2000).

These environments support waterfowl, fish, aquatic invertebrates, and benthic invertebrates, as well as emergent vegetation such as willows, rushes, and cattails.

2.3 CHARACTERIZATION OF EMISSIONS

The Phase I ERA will evaluate several sources of emissions from the treatment of agent munitions. The emission sources at TOCDF include the LIC1, the LIC2, the MPF, the DFS, the brine reduction area (BRA), and the HVAC filter system. The CAMDS sources include the MPF, the DFS, and the HVAC filter system. Detailed information regarding these units is presented in the protocol for the DCD HHRA (Tetra Tech 2001b).

The Phase I ERA will be performed based on available information indicating the agent campaigns at TOCDF would last for a total of 13 years (from 1996 to 2009). For TOCDF, current information indicates that the GB campaign will consume 59 percent (7.67 years) of the total time, the VX campaign will require 19 percent (2.47 years) of the total time, and the sulfur mustard campaign will use 22 percent (2.86 years) of the total time. To evaluate risk associated with treatment of munitions at CAMDS, DSHW estimated a total operating period of 10 years based on available information (Tetra Tech 2001b; 2002a).

Section 2.3.1 describes the basic configuration and operation of each of these units and the data available to characterize emissions. Section 2.3.2 summarizes procedures used to estimate emission rates and presents the emission rate values for compounds with available data. Detailed information on available emissions data and procedures for extrapolating emission rates is presented in the TOCDF HHRA protocol (Tetra Tech 2001b).

2.3.1 TOCDF Emission Sources

The design and operation of TOCDF is based on the design and operation of the Johnston Atoll Chemical Agent Disposal System (JACADS). The demilitarization process at TOCDF involves three major steps: (1) handling and transferring chemical munitions from the Area 10 Storage facility to TOCDF; (2) storing, disassembling, and incinerating the munitions; and (3) managing the waste materials that remain after incineration (DSHW 1989). These activities are generally carried out in four separate areas of the TOCDF: (1) the container handling building (CHB), (2) the munitions demilitarization building (MDB), (3) the pollution abatement system (PAS) building, and (4) the process utilities building (PUB).

Chemical munitions and agents transferred from the Area 10 Storage facility are typically unloaded at the CHB. Storage activities are conducted in the CHB and MDB. Disassembly and incineration activities are conducted in the MDB. The MDB houses four different incinerators: the MPF, the DFS, and two LICs (LIC1 and LIC2). The LICs, MPF, and DFS may operate at the same time. Emissions from each incinerator are treated by a separate PAS in the PAS building, before venting to a common stack.

The MDB is kept under negative pressure by the HVAC system to prevent fugitive emissions. Emissions from the HVAC system are vented to a stack separate from the BRA PAS stack and the common stack for the MPF, DFS, and LIC. Agent-free PAS byproducts (brines) may be treated in the BRA. The BRA, except for the BRA burner and baghouses, is located inside the PUB. Emissions from the BRA PAS are vented to a stack separate from the common stack for the MPF, DFS, and LICs.

2.3.2 CAMDS Emission Sources

Originally designed and constructed as a research and development facility for chemical munitions demilitarization, the CAMDS is the prototype facility upon which other chemical munition incineration complexes are based (including TOCDF). CAMDS has only operated intermittently in the last several years. However, a new mission anticipated for CAMDS includes providing assistance to TOCDF in the chemical munition stockpile destruction program at DCD. The Phase I ERA is based on the assumption that CAMDS will complete this mission through continuous operations.

The demilitarization process at CAMDS involves three major steps: (1) handling and transferring chemical munitions from the Area 10 Storage facility to CAMDS, (2) disassembling and incinerating chemical munitions and agents, and (3) managing the waste materials that remain after incineration (CAMDS 1996; 1999). At the CAMDS, the MPF and LIC are housed within the MPF Building Complex, which also includes the MPF, LIC, Multipurpose Demilitarization Machine, Multipurpose Demilitarization Facility, Bulk Item Facility, Residual Storage Area, and Central Decontamination Supply operations. These structures are all conjoined and share interior walls. Each area is independently ventilated by ducting leading to the HVAC filter farm.

The DFS Building Complex is located in a separate building to the east of the MPF Building Complex. The DFS Building Complex includes the DFS, Unpack Area, Explosive Containment Cubicle, Segregation Area, and Filter 18. Each area is independently ventilated by ducting leading to the HVAC filter system, which is located within the East Utilities Building complex.

Chemical munitions and agents transferred from the Area 10 Storage facility are typically unloaded at the Unpack Area. Disassembly and incineration activities are conducted in both the MPF and DFS Building Complexes, which house the three different incinerators at CAMDS: the CAMDS MPF, the CAMDS DFS, and the CAMDS LIC. The DFS may operate at the same time as either the MPF or LIC, but the MPF and LIC cannot operate at the same time. However, if one furnace is operating, the other furnace can operate in a “standby” mode to maintain the furnace at a high temperature condition using natural gas. Because the MPF produces more emissions than the LIC, the Phase I ERA will evaluate the MPF, and the results may be used to indirectly evaluate the LIC.

Emissions from the DFS are treated by a separate PAS, before venting to a separate stack. Emissions from the MPF and LIC are treated by a common PAS, before venting to a common stack. PAS byproducts (brines) are then collected for off-site disposal. The CAMDS BRA is not in operation and will not be used to treat hazardous waste until a compliance test can be performed to demonstrate the current configuration of the BRA drum dryers and “whirlwet” PAS.

2.3.3 Summary of Procedures for Estimating Emission Rates

The Phase I ERA will evaluate emissions for six sources located at TOCDF and four sources located at CAMDS. The sources at TOCDF include the LIC1, LIC2, MPF, DFS, BRA, and HVAC system. The sources at CAMDS include the MPF, DFS, LIC, and HVAC system. Because the LIC and MPF at CAMDS cannot be used to treat chemical munitions simultaneously, the MPF at CAMDS will be evaluated as representative of both units. Because the TOCDF MDB and CAMDS MPF and DFS building complexes are maintained at a negative pressure by the HVAC systems, a separate evaluation of fugitive emissions was not completed. Fugitive emissions are not expected in the other areas of the TOCDF and CAMDS facilities. This section summarizes the procedures for estimating COPC emission rates for TOCDF and CAMDS. A detailed description of the procedures used to estimate emission rates is presented in the DCD HHRA (Tetra Tech 2002a).

Stack gas emission rates were calculated for each emission source (including the CAMDS LIC but not the TOCDF and CAMDS HVAC units) for each compound based on stack gas concentrations and stack gas volumetric flow rates from available trial burn and test burn data. Emission rates were calculated two ways: (1) from available trial burn test and test burn data from TOCDF and CAMDS, or (2) by extrapolating from emission rates from trial burn tests for similar units at another facility (CAMDS, TOCDF, or JACADS) for sources for which trial burn or test burn data were not available. Emission rate calculations were conducted in accordance with current U.S. EPA guidance (1999). Deviations from this guidance are identified and discussed in the HHRA protocol (Tetra Tech 2001b). The Phase I ERA is based on weighted-average emission rates for the TOCDF units and worst-case emission rates for the CAMDS units (Tetra Tech 2002a). The weighed-average emission rates for the TOCDF are based on agent campaign-specific emission rates and the duration of the campaign. These emission rates are discussed in greater detail in the HHRA report (Tetra Tech 2002a).

Agent emission rates for the PAS common stack were calculated based on the agent-specific allowable stack gas concentrations (Tetra Tech 2001b). For the TOCDF and CAMDS HVAC units, only GB, VX,

and sulfur mustard were assumed to have the potential to be emitted. Chemical agents were assumed to be emitted from the HVAC units at concentrations equal to the alarm level of the automatic continuous air monitoring system (ACAMS) (20 percent of the agent 8-hour time weighted average) and maximum stack gas flow rate (Tetra Tech 2002a).

The weighted-average and worst-case emission rates for TOCDF sources and CAMDS sources are presented in Tables A-1 through A-6 in Appendix A.

2.4 COMPOUNDS OF POTENTIAL CONCERN

COPCs are the chemicals that are evaluated in a SLERA (U.S. EPA 1999). For COPCs for which fate, transport, exposure, and toxicity parameters are available, risk is evaluated quantitatively. COPCs with incomplete parameter sets are evaluated as uncertainties. This section describes the selection of COPCs for the Phase I ERA and presents the COPCs identified.

Potential COPCs for the emission sources at DCD include: (1) chemical agents present in the chemical munition stockpile; (2) explosives, propellants, and other energetic compounds present as components of the chemical munitions; (3) metals and other inorganic compounds present as components (casings or containers) in the munitions; (4) organic compounds present in the components of the chemical munitions (for example, polychlorinated biphenyls [PCB]); and (5) products of incomplete combustion (PIC) from the furnaces at TOCDF or CAMDS. Based on U.S. EPA (1999), PICs may include the following:

- Compounds initially present in the waste feed stream that are not completely destroyed in the combustion process
- Compounds that are formed during the combustion process

PICs are typically categorized as volatile organic compounds (VOC), semivolatile organic compounds (SVOC), polychlorinated dibenzo(p)dioxins (PCDD), polychlorinated dibenzofurans (PCDF), and tentatively identified compounds (TIC).

In accordance with U.S. EPA (1999) guidance, the following 6 steps were followed to identify the COPCs to be evaluated in the Phase I ERA:

Step 1: A list of compounds analyzed in the stack tests was compiled, and it was determined whether or not a compound was detected.

Step 2: The type of waste burned in the combustion unit—including all wastes that the unit will be permitted to burn—was evaluated to determine whether any of the non-detect compounds should be retained for evaluation as COPCs because they are present in the waste.

Step 3: Compounds that are non-detect, but have a high potential to be emitted as PICs, were identified as COPCs.

Step 4: Compounds that are non-detect, but have a tendency to bioaccumulate or bioconcentrate, were identified as COPCs. These include any organic compound with a log K_{ow} value of 4.0 or more, and any inorganic compound with a whole-body bioconcentration factor of 100 or more.

Step 5: The compounds with the 30 largest TIC peaks obtained during gas chromatography (GC) analysis were evaluated to determine whether any of the TICs have toxicities similar to the detected compounds. If the TICs have similar toxicities, the use of surrogate toxicity information was considered.

Step 6: Compounds that may be of concern due to other site-specific factors and may be emitted by a combustion unit were identified as COPCs.

The compounds identified as target analytes in Step 1, waste feed constituents in Step 2, and TICs in Step 5 were identified as potential COPCs for this SLERA. The next step in the COPC-identification process was to identify toxicological information to determine which COPCs can be evaluated quantitatively. Information about the potential toxicity of the COPCs to the communities and guilds targeted for evaluation in the Phase I ERA is limited. U.S. EPA (1999) identifies more than 40 compounds common to emissions from hazardous combustion units and collected toxicological information on these compounds. More recently, the Anniston Chemical Agent Disposal Facility (ANCDF) ERA protocol (USACHPPM 2002) presented ecological toxicity information on compounds not listed in U.S. EPA (1999). These two compendia are considered to represent thorough reviews of available toxicity information. Therefore, COPCs with toxicity information in U.S. EPA (1999) and USACHPPM (2002) were evaluated quantitatively, for one or more communities and guilds, in the Phase I ERA. In addition, GB, VX, and sulfur mustard were identified as COPCs that could be quantitatively evaluated for mammalian receptors based on the availability of mammalian toxicity data. In order to consistently evaluate the potential risk from all of the emission sources at TOCDF and CAMDS, the same list of COPCs will be used for all of the emission sources. The list of COPCs includes several compounds that were not detected in stack gas samples. The emission rates and, by extension, the exposure assessments for these compounds are based on the maximum nondetected values among stack gas samples collected. The uncertainties associated with this procedure will be identified and discussed in the risk assessment report. The COPCs are as follows (asterisk designates a compound identified based

on toxicity information from USACHPPM [2002]):

- PCDDs and PCDFs will be modeled as 2,3,7,8-tetrachlorodibenzo(p)dioxin toxicity equivalents
- Polycyclic aromatic hydrocarbons
 - Benzo(a)pyrene
 - Benzo(a)anthracene
 - Benzo(b)fluoranthene
 - Benzo(k)fluoranthene
 - Chrysene
 - Dibenzo(a,h)anthracene
 - Indeno(1,2,3-cd)pyrene
- Polychlorinated biphenyls
 - Aroclor 1016
 - Aroclor 1254
- Nitroaromatics
 - 1,3-Dinitrobenzene
 - 2,4-Dinitrotoluene
 - 2,6-Dinitrotoluene
 - Nitrobenzene
 - Pentachloronitrobenzene
 - 2,4,6-Trinitrotoluene
- Phthalate esters
 - Bis(2-ethylhexyl)phthalate
 - Di-n-octylphthalate
 - Di-n-butylphthalate*
 - Diethylphthalate*
- Inorganics
 - Aluminum
 - Antimony
 - Arsenic
 - Barium
 - Beryllium
 - Boron*
 - Cadmium
 - Chromium
 - Copper
 - Total Cyanide
 - Lead

- Mercury (inorganic)
 - Methyl mercury
 - Nickel
 - Selenium
 - Silver
 - Thallium
 - Zinc
- Volatile organics
 - Acetone
 - Acrylonitrile
 - Bromoform
 - Chloroform
 - Crotonaldehyde
 - 1,4-Dioxane
 - Formaldehyde
 - Vinyl chloride
 - Ethylbenzene*
 - n-hexane*
 - 1,1,2,2-Tetrachloroethane*
- Chemical agents
 - GB
 - VX
 - Sulfur mustard
- Other compounds
 - Benzoic acid*
 - Benzyl alcohol*
 - Cyclotrinitraminemethylene (RDX)*
 - Decane*

2.5 SUMMARY OF AIR DISPERSION MODELING

This section presents an overview of the atmospheric dispersion modeling performed at DCD in November 1999 (MRI 1999). The modeling was performed with the current version (99155) of U.S. EPA's Industrial Source Complex Short-Term (ISCST3) model. The modeling was adapted from the air modeling performed for the *Screening Risk Assessment* (ATK 1996). The report, which was attached to the TOCDF HHRA report (Tetra Tech 2002a), provides a detailed description of the modeling methods, including modifications in accordance with U.S. EPA (1999), as well as a listing of the output. Section 2.5.1 provides a general overview of the technical approach to the air modeling. Section 2.5.2 summarizes the site-specific characteristics considered in the air modeling. Section 2.5.3 discusses the partitioning of emissions. Section 2.5.4 presents the meteorological data used in the air modeling. Section 2.5.5 discusses the air modeling results.

2.5.1 Overview of Air Modeling Procedures

The objective of the air dispersion modeling was to provide unitized concentrations and deposition values for the HHRA and Phase I ERA (MRI 1999). The ISCST3 atmospheric dispersion model requires three main types of data: (1) emission source parameters, (2) receptor locations (grid nodes), and (3) meteorological information. The air modeling procedures were developed in accordance with U.S. EPA (1998) guidance, as follows:

- A common receptor coordinate system was centered on a point located between the TOCDF and CAMDS facilities. The point was placed at the Universal Transverse Mercator (UTM) coordinates of 384,000 meters (m) Easting and 4,461,000 m Northing (Zone 12). The single coordinate system center was used so that the total effect of all emission sources of a specific COPC could be evaluated. A polar coordinate system extending a radius of 20 kilometers (km) from the center point was employed to determine unitized deposition rates and concentration values at each receptor grid node. The coordinate system was set up with 10-degree intervals. Both initial screening runs and refined modeling runs were performed. In addition, two refined receptor grids were evaluated for DCD and three extra grid nodes were placed at Rush Lake. In addition, two supplemental coordinate arrays with denser-spaced nodes were centered on TOCDF and CAMDS to determine on-site maximum impacts. The coordinate arrays evaluated in the air dispersion modeling are presented on Figure 2-2. The 20-km radius represents the assessment area for the Phase I ERA.

Figure 2-2

- The location of each release point was referenced to the common origin. Each emission release point was modeled using stack-specific values, such as exit temperature, gas velocity, and stack height, but at a unit emission rate (1 gram per second [g/s]).
- Two initial screening runs showed that the off-site maximum concentrations occurred along the DCD property boundary. For this reason, discrete receptors along the property line were evaluated during the refined screening runs.
- For each source modeled, a separate output file was generated that contains the unitized deposition rates and concentration values at each grid node location, for each individual source.
- The above process was repeated (omitting the screening runs) three times to determine vapor phase emissions, particle phase emissions, and particle-bound emissions.

To determine COPC-specific concentration values and deposition rate values, the normalized concentration values and deposition rate values were multiplied by the COPC-specific mass emission rates (see Section 2.3 and Appendices A-1 and A-2).

2.5.2 Site-Specific Characteristics

The following sections discuss the site-specific characteristics used in the atmospheric dispersion modeling for DCD. Section 2.5.2.1 summarizes how each of the combustion units was handled in the air modeling. Section 2.5.2.2 presents how building wake effects were evaluated. Section 2.5.2.3 describes how watersheds were identified and evaluated in the air modeling.

2.5.2.1 Combustion Unit Emission Characteristics

A total of 10 emission sources were evaluated in the atmospheric dispersion modeling, including (1) emissions from the incinerators at TOCDF and CAMDS facilities, and (2) emissions from the TOCDF BRA and HVAC system and the CAMDS HVAC system (MRI 1999). Table 2-1 presents the sources that were considered at each of the facilities and the source-specific parameters used in the modeling, including location (UTM coordinates), base elevation, stack height, stack gas temperature, stack gas velocity, and stack diameter. Each source was modeled individually by referencing the geographical location of each source to the common coordinate system centered at 384,000 m Easting and 4,461,000 m Northing (the center point between TOCDF and CAMDS). For modeling the sources at TOCDF that exhaust through a common stack, it was assumed that only one unit is operating at a time (MRI 1999).

TABLE 2-1

AIR MODELING SOURCES AND SOURCE-SPECIFIC PARAMETERS USED IN AIR DISPERSION MODELING

	UTM Easting	UTM Northing ^a	Base Elevation (m)	Stack Height (m)	Gas Temperature (K)	Gas Velocity (m/s)	Stack Diameter (m)
TOCDF							
DFS	385,278	4,462,170	1576	30.5	387	6.81	1.5
LIC	385,278	4,462,170	1576	30.5	396	3.23	1.5
MPF	385,278	4,462,170	1576	30.5	384	3.68	1.5
BRA	385,337	4,462,031	1576	19.8	398	13.1	1.4
HVAC	385,234	4,462,266	1576	36.6	296	12.3	2.2
CAMDS							
HVAC	383,860	4,460,337	1536	5.82	300	30.8	0.56
DFS	383,858	4,460,307	1536	20.7	379	19.9	0.61
MPF	383,847	4,460,248	1536	19.0	388	10.7	0.61
BRA	383,767	4,460,336	1536	13.7	339	7.0	0.61

Notes:

CAMDS Chemical Agent Munitions Disposal System
 BRA Brine reduction area
 DFS Deactivation furnace system
 HVAC Heating, ventilation, and air conditioning system
 K Kelvin
 LIC Liquid incinerator; includes LIC1 and LIC2
 m Meter
 m/s Meter per second
 MPF Metal parts furnace
 TOCDF Tooele Chemical Agent Disposal Facility
 UTM Universal Transverse Mercator

^a Only 6-digit UTM coordinates are allowed in the ISCST3 model.

Modeling sources separately allows DSHW to evaluate (1) individual risk attributed to each emission source, (2) risk from all units operating concurrently, and (3) risk from all possible combinations of emission sources. This approach will provide DSHW with the ability to meet risk management obligations as the permitting authority by allowing individual emission source impacts to be considered as well as providing a conservative estimate of risk from all RCRA emission sources.

2.5.2.2 Building Wake Effects

The ISCST3 model also accounts for building wake effects on dispersed plumes (MRI 1999). The model requires specific inputs, including direction-specific building heights and widths that account for elevation views of buildings under various wind directions. DSHW provided the data on building dimensions and locations, which was supplemented by additional information collected during an April 1998 site visit to the TOCDF and CAMDS facilities. The building heights and lateral dimensions are summarized in Table 8 of the air modeling report (attached to the HHRA report [Tetra Tech 2002a]).

2.5.2.3 Watersheds

Water bodies and watersheds are important factors for evaluating exposure through surface water and sediment pathways. MRI used a subset of the refined modeling grid to characterize the watershed of Rush Lake. In addition, the Phase I ERA will evaluate three other water bodies: (1) Rainbow Reservoir, which is on the DCD facility and may be stocked with fish; (2) Clover Pond, a wetland area inside the west fence line of DCD; and (3) Atherly Reservoir, about 9 km south-southwest of DCD, which is part of Fitzgerald Wildlife Management Area.

2.5.3 Partitioning of Emissions

In accordance with U.S. EPA (1999) guidance, the emissions were partitioned as (1) vapor phase, (2) particle phase, and (3) particle-bound emissions (MRI 1999). The ISCST3 model calculates air concentrations and wet, dry, or combined deposition values. The model also includes the effects of plume depletion by both wet and dry mechanisms.

2.5.4 Meteorological Data

Meteorological data collected from 1986 through 1990 at the Salt Lake City International Airport (SLC) were used in the atmospheric dispersion modeling (MRI 1999). The data were obtained from two sources:

- National Climatic Data Center (NCDC) Solar and Meteorological Surface Observation Network (SAMSON) 1961-1990 CD-ROM for SLC (Station 24127)
- Upper air data (mixing height) obtained from EPA's Support Center for Regulatory Air Models (SCRAM) bulletin board for SLC

The data were selected by comparing SLC data to the on-site meteorological data collected within 1 mile of TOCDF. Because of a slight mismatch in wind direction, the SLC data were rotated 10 degrees counterclockwise. MRI used U.S. EPA's program, PCRAMMET (the personal computer version of the meteorological preprocessor for the old RAM program) to determine all hourly observations. Due to a lack of site-specific data, MRI also developed default data based on information obtained from the PCRAMMET user's guide as input parameters.

2.5.5 Air Modeling Results

The air modeling results indicated that the off-site maximum air concentrations and wet and dry depositions occurred along the north and west property lines. Section 6 of the air dispersion modeling report describes how the air modeling results are organized and identified in a series of spreadsheet files (MRI 1999). The output files were not, however, compatible with the EcoRisk View software that will be used to perform the risk characterization computations. Therefore, the atmospheric dispersion modeling was re-run specifying the electronic output files required for the EcoRisk View software. The electronic output files were identical to the hard copy output files presented in the atmospheric dispersion modeling report (MRI 1999).